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MADE IN USA

CE

**CAUTION! – This product is not intended for medical use or use on humans**

OMEGA®

# User's Guide

**OS101E**

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**OS102E**

# OS100E SERIES
# Mini-Infrared Transmitters

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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.
**WARNING:** These products are not designed for use in, and should not be used for, human applications.

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## Safety Warnings and IEC Symbols

This device is marked with international safety and hazard symbols in accordance with IEC 1010. It is important to read and follow all precautions and instructions in this manual before operating or commissioning this device as it contains important information relating to safety and EMC. Failure to follow all safety precautions may result in injury and or damage to your calibrator.

| IEC symbols | Description |
|---|---|
| | Caution, refer to accompanying documents |
| | Direct Current |
| | Laser Symbol |
| | Frame or Chassis |

## Caution and Safety Information

- If the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.
- The installation category is one (1).
- There are no user replaceable fuses in this product
- The output terminals of this product are for use with equipment (digital meters, chart recorders, etc,) which have no accessible five parts. Such equipment should comply with all the applicable safety requirements.
- Do not operate the equipment in flammable or explosive environments.
- All connections to the thermometer should be made via a shielded cable, 24 AWG stranded wire with the following ratings: 300V, 105°C (221°F), PVC insulation.
- Power must be disconnected before making any electrical connections.
- The power supply used to power the thermometer should be VDE or UL approved with the following ratings: 12 to 24vdc @150mA with overload protection of 500mA.

**NOTES:**

# Section 1 - Introduction

The low cost OS101E mini-infrared transmitter provides non-contact temperature measurement for industrial applications. The unit measures a temperature range of -18 to 538°C (0-1000°F) and provides a linear analog output of either 4-20 mA, 0-5 VDC, K type TC, 1 mV/°C, or 1 mV/°F.

The new OS102E mini-infrared transmitter has all the functions of OS101E plus a built-in LED display that shows the measured temperature in degrees F or degrees C which is switchable in the field.

The miniature sensor head design 2.5 cm dia. x 6.3 cm Length (1" x 2.5") is ideal for measuring temperature in confined, and hard to reach places. The aluminum sensor head as well as the rugged electronic housing (Die cast Aluminum) are NEMA-4 rated.

The sensor head is connected to the electronic housing via a 1.82 m (6 feet) shielded cable as standard. The unit provides field adjustable alarm output.

# Section 2 - Installation

## 2.1 Unpacking

Remove the packing list and verify that you have received all your equipment. If you have any questions about the shipment, please call Customer Service at:

**1-800-622-2378 or 203-359-1660**. We can also be reached on the internet:
**omega.com e-mail: info@omega.com**

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE:

The carrier will not honor any damage claims unless all the shipping materials are saved for inspection. After examination and removing contents, save packing material and carton in the event reshipment is necessary.

The following items are supplied in the box:

- The infrared transmitter including the sensor head and the 1.82 m (6 feet) shielded cable
- User's Manual
- Mounting Nut

The following describes the ordering information:

**OS102E or OS101E - MA -** **, where

MA - 4/20 mA output
V1 - 0 to 5 VDC output
K - Thermocouple output, K type
MV - Millivolt output

HT- High temperature sensor head

The following optional accessories are available:

| Model No. | Description |
|---|---|
| **OS100-MB** | Mounting Bracket |
| **OS100-DR** | DIN Rail Mounting adapter |
| **OS100-WC** | Water Cooling jacket |
| **OS100-AP** | Air purge collar |
| **OS100-LS** | Laser Sighting |
| **OS100-CA15FT** | Sensor Head Extension Cable (4.6 m, 15") |
| **OS100-CA25FT** | Sensor Head Extension Cable (7.6 m, 25') |
| **TX8-100** | 8 Conductor stranded Shielded cable (30 m, 100') |
| **PSU-93** | Unregulated 16-24 VDC Power Supply |
| **CAL3-IR** | NIST Traceable Calibration |

Here are the Features of OS101 and OS102 infrared transmitters:

| Features | 101E | 102E |
|---|---|---|
| **Accuracy** | 2% Rdg or 4°F (2.2°C) | |
| **Temp Range** | 0-1000°F (-18 to 538°C) | |
| **Emissivity** | 0.1 to 1.00 Adj. | |
| **Field of View** | 6 to 1 | |
| **Alarm Output** | Standard | |
| **1mV/Deg. Output** | Standard | |
| **4-20mA Output** | Standard | |
| **0/5 VDC Output** | Standard | |
| **K Type T/C** | Standard | |
| **RS232 PC Interface** | Standard | |
| **LED Display** | — | Standard |
| **Main Housing** | 65.5 x 30.5 x 115.3 mm (2.58" x 1.2" x 4.54") | |

## 2.2 Electrical Connection

**Sensor Head Cable** - The Sensor head is pre-wired to a 1.8 m (6 feet) shielded cable. Plug & lock-in the male connector to the mating female connector on the aluminum housing.

**Power & Output Connection** - Open the cover of the main aluminum housing. Slide the cable through the strain relief and connect the wires to the terminal block on the board as shown in Fig. 2-1. For Alarm output connection, refer to Fig. 2-2.

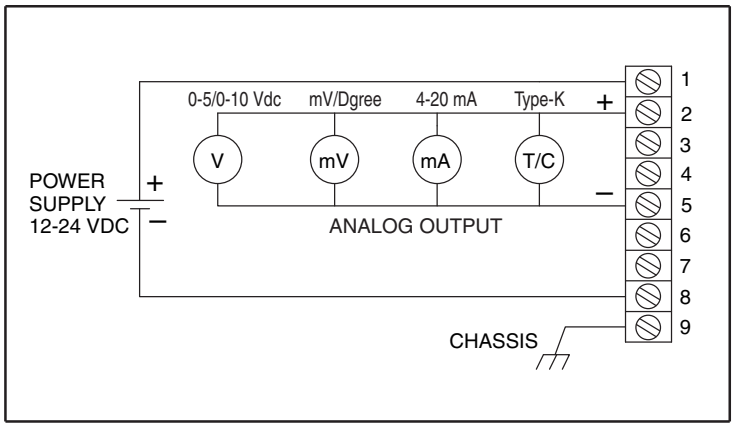



**Figure 2-1. Power Supply & Analog Output Connections**

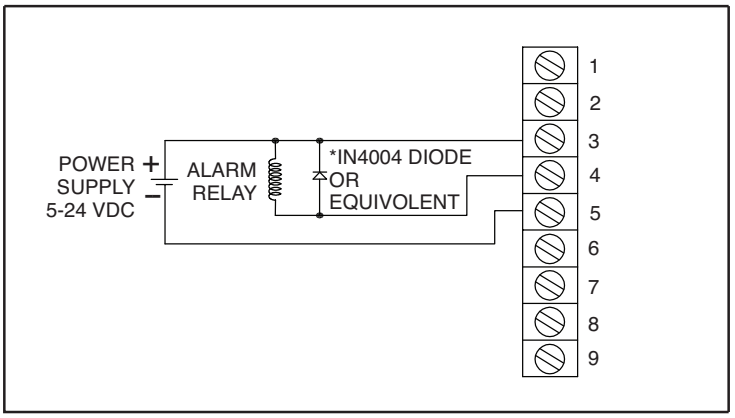



**Figure 2-2. Alarm Output Connection**

# Section 3 - Operation

## 3-1 Main Board

The Main Board is shown in Fig. 3-1. Here are the important components on the board:

(1) - Terminal Block for Power & Output connections

(2) - Single Turn Potentiometer to adjust Emissivity in tenths (0.x_)

(3) - Single Turn Potentiometer to adjust Emissivity in hundreds (0._x)

(4) - Slide switch to select between real time (Normal Operation) and alarm set point

(5) - Alarm set point adjust, P3

(6) - °F to °C Jumper setting

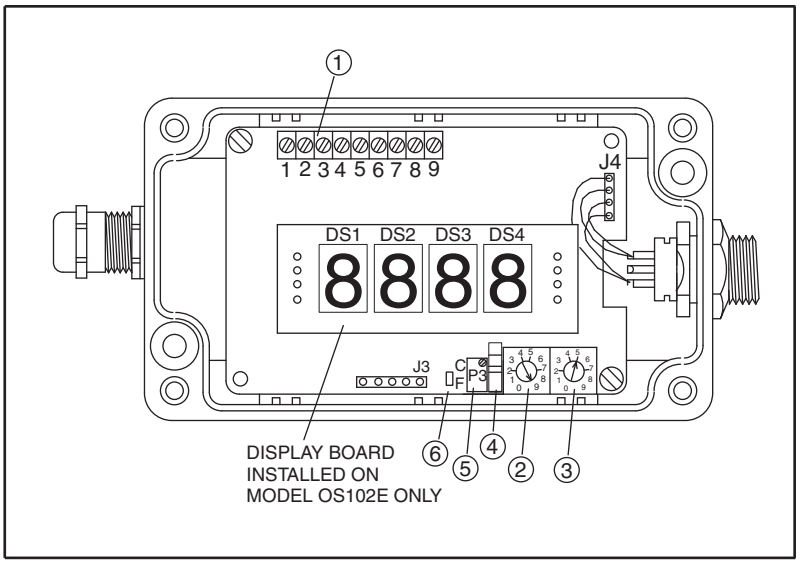



**Figure 3-1. Main PC Board**

## 3.2 Ambient Temperature

The Sensing head can operate in an ambient temperature of 0 to 70°C (32 to 158°F). The Sensing head in the high temperature model (-HT) can operate in an ambient temperature of 0 to 85°C (32 to 185°F) without any cooling required. The Sensing head can operate up to 200°C (392°F) using the water cool jacket accessory OS100-WC (See Fig. 3-6).

There is a warm up period of 3 minutes after power up. After the warm up period, temperature measurement can be made.

When the ambient temperature around the sensor head changes abruptly, the sensor head goes through thermal shock. It takes a certain amount of time for the sensor head to stabilize to the new ambient temperature. For example, it takes about 30 minutes for the sensor head to stabilize going from 25°C to 50°C (77 to 122°F) ambient temperature.

The sensor head dimensions are shown in Fig. 3-2.

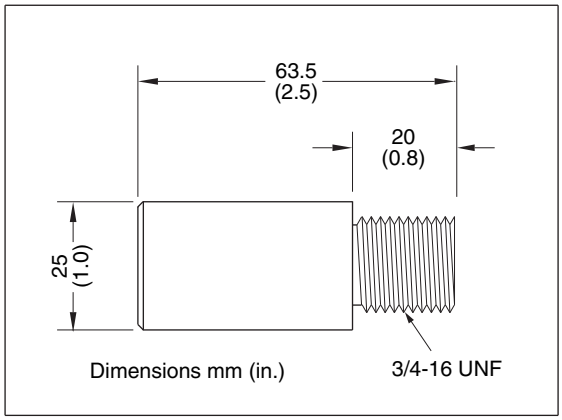



**Figure 3-2. Sensor Housing**

## 3.3 Atmospheric Quality

Environments with smoke, dust, and fumes dirty up the optical lens, and cause erroneous temperature readings. To keep the surface of the optical lens clean, the air purge collar accessory is recommended, OS100-AP, See Fig. 3-7.

## 3.4 Measuring Temperature

Before starting to measure temperature, make sure that the following check list is met:

- The power and analog output connections are made (Fig. 2-1).
- The sensor head is connected to the main unit.
- The slide switch (SW1) on the main board is set to real time (Fig. 3-1).
- The target is larger than the optical field of view of the sensor head (Fig. 3- 3 ).
- The emissivity adjustment on the main board is set properly (Fig. 3-1).
- The output load is within the product specification.

On 102E transmitters, follow these additional steps:

- The temperature display is set to °F or °C (Fig. 3-1)
- For 4-20mA output models, make sure an output load is added, ie. 250 ohms.

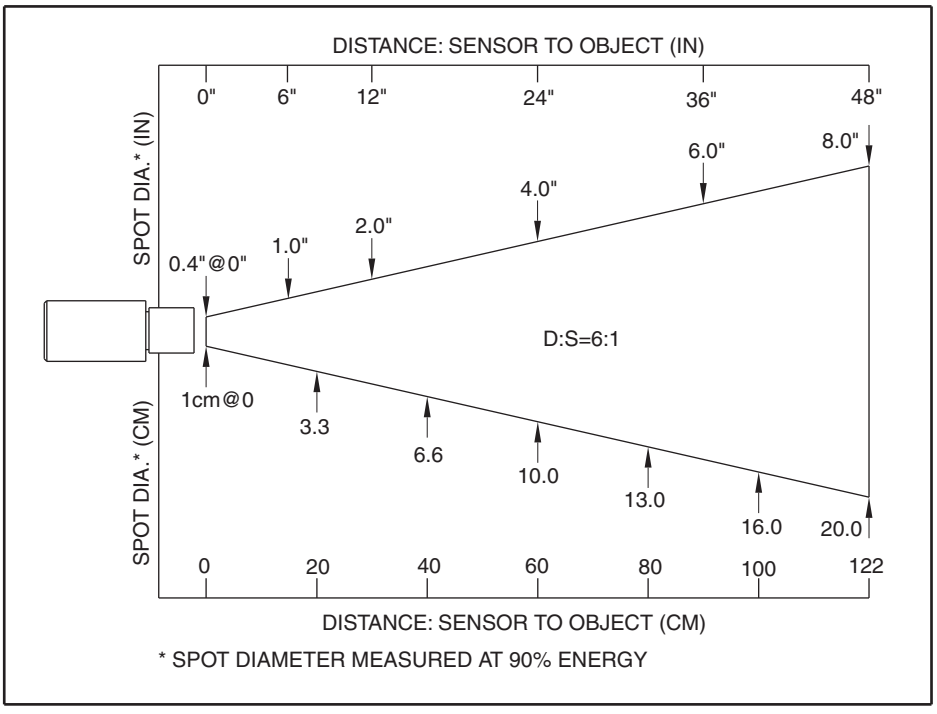



**Figure 3-3. Optical Field Of View**

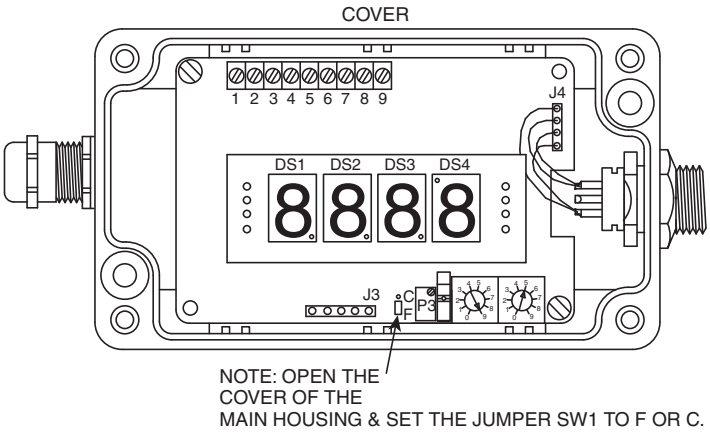



**Figure 3-4. Setting the Temperature Engineering Unit**

## 3.5 Alarm Setting

The unit provides 0-100% alarm set point adjustment. Here is an example of an alarm setting.

- An OS101E-MA (4/20 mA output), the alarm is to be set at 400°F temperature.
- Connect the alarm output as shown in Fig. 2-2.
- Set the slide switch (SW1) on the main board to the Alarm position.
- Measure the analog output, and set the Potentiometer P3 until the output reads 10.4 mA which is 40% (400°F) of the temperature range.
  $[10.4\text{mA} = \frac{40 \times (20-4)}{100} + 4]$
- Set the slide switch (SW1) back to the Real Time position.
- If the temperature reading is below the alarm set point, the alarm output stays high, otherwise it goes low.

On the OS102E, you can set the alarm set point directly based on the temperature display.

## 3.6 Adding Extension Cable

You can add extension cable between the Sensor Head and the main electronic housing up to 15.2 m (50 feet). After adding the extension cable, follow the steps in section to adjust the cable offset.

The following figures show the mounting bracket (OS100-MB), Water cooling jacket (OS100-WC), Air purge collar (OS100-AP), DIN Rail Mounting adapter (OS-100-DR), and the main aluminum enclosure. The DIN Rail Mounting adapter (OS100-DR) is mounted to the bottom of the main aluminum enclosure using two 4-40 screws.

A typical water cool jacket assembly is shown in Fig. 3-7, on the following page.
1. Mounting Nut
2. Mounting Bracket
3. Water Cool Jacket
4. Sensor Head

## 3.7 RS-232

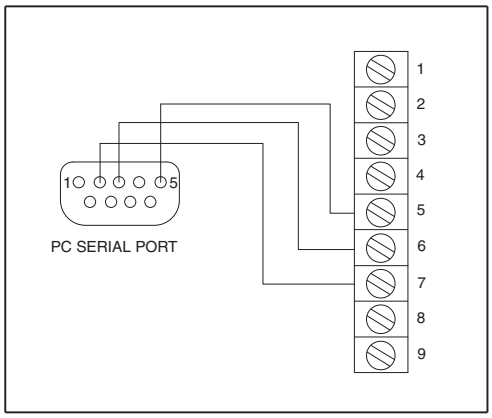



**Figure 3-5. RS232 PC Interface Connection**

### OS101E/ OS102E RS232 Command Reference:

Note: All commands sent to the OS100E series must be terminated by a carriage return or carriage return and linefeed, and is shown in this document as "CR" and "LF". Any parameters shown in square brackets "[ ]" are optional. Parameters are separated from commands and from each other by a space " ". Spaces within commands are shown in this document as "SP". All commands are case insensitive, meaning any combination of upper/lower case characters are accepted.

In order to communicate with the OS101E/OS102E, the terminal (or PC running a terminal program such as HyperTerminal) must have the following serial communication settings:

| | |
|---|---|
| Baud: | 19200 |
| Data Bits: | 8 |
| Parity: | None |
| Stop Bits: | 1 |
| Handshaking: | None |

### C Command:

**Description:** - Transmit Target temperature in Deg C (one time).

**Syntax:** **C CR [LF]**

**Parts:** None. There are no parameters for this command.

**Remarks:** None.

**Example:**

Assuming target temperature is 125 °C, the following is shown on the PC (terminal) screen after typing "C" and "Enter":

**C**
**125**

### F Command:

**Description:** - Transmit Target temperature in Deg F (one time).

**Syntax:** F CR [LF]

**Parts:** None. There are no parameters for this command.

**Remarks:** None.

**Example:**

Assuming target temperature is 257 °F, the following is shown on the PC (terminal) screen after typing "F" and "Enter":

**F**
**257**

### ALARM Command:

**Description:** Transmit alarm setpoint.

**Syntax:** **ALARM$_{CR}$ [$_{LF}$]**

**Parts:** None. There are no parameters for this command.

**Remarks:**

The purpose of this command is to transmit the current alarm setpoint only. The only method of changing setpoint is by opening the OS101E/OS102E case, and adjusting the alarm setpoint potentiometer.

**Example:**

The following is shown on the PC (terminal) screen after typing "ALARM" and "Enter":

**ALARM**
**537 C**
**999 F**
**>**

### VERSION Command:

**Description:** - Transmit model number, firmware version, and output mode.

**Syntax:** **VERSION CR [LF]**

**Parts:** None. There are no parameters for this command.

**Remarks:**

Units with a display attached will transmit "OS102E" as the model number. The example below shows a unit without a display attached. The firmware version is a six-digit number following the "FW:" shown below. Depending on the model suffix (the first characters immediately following OS101-/OS102-), the "OUTPUT:" will be transmitted as follows:

| Model Suffix | OUTPUT: |
|---|---|
| K | TC-K |
| MV-C | mV/Deg C |
| MV-F | mV/Deg F |
| V1 | 0-5V |
| V2 | 0-10V |
| MA | 4-20mA |

**Example:**

The following is shown on the PC (terminal) screen after typing "VERSION" and "Enter":

**>VERSION**

**OMEGA ENGINEERING**
**OS101E FW: 061013**
**OUTPUT: mV/ Deg F**
**>**

### AMODE Command:

**Description:** - Set/Transmit alarm activation mode rising/falling.

**Syntax:** **AMODE[SP MODE] CR [LF]**

**Parts:**

MODE (OPTIONAL)

Specifies whether the alarm will activate at the setpoint with rising temperature, or falling temperature. The valid range for this parameter is 0 to 1. A value of 1 will cause the alarm to activate on rising temperature, and 0 will cause activation on falling temperature. If this parameter is not specified, the mode currently set will be transmitted.

**Remarks:**

The default mode for alarm activation is "rising". The only way to change the activation mode is through the RS232 "AMODE" command.

**Example 1:**

The following is shown on the PC (terminal) screen after typing "AMODE" and "Enter". The activation mode is not changed, but it is reported.

**AMODE**
**ALARM MODE SET FOR**
**RISING TEMP.**
**>**

**Example 2:**

The following is shown on the PC (terminal) screen after typing "AMODE 0" and "Enter". The activation mode is changed to "falling" and reported as such.

**AMODE 0**
**ALARM MODE SET FOR**
**FALLING TEMP.**
**>**

**Example 3:**

The following is shown on the PC (terminal) screen after typing "AMODE 1" and "Enter". The activation mode is changed to "rising" and reported as such.

**AMODE 1**
**ALARM MODE SET FOR**
**RISING TEMP.**
**>**

### EMS Command:

**Description:** - Transmit emissivity setting.

**Syntax:** **EMS CR [LF]**

**Parts:** None. There are no parameters for this command.

**Remarks:**

The purpose of this command is to transmit the current emissivity setting only. The only method of changing the emissivity setting is by opening the OS101E/OS102E case, and adjusting the emissivity potentiometers.

**Example:**

The following is shown on the PC (terminal) screen after typing "EMS" and "Enter":

**EMS**
**E = 0.95**
**>**

**CABLE Command:**

**Description:** - Set/Transmit cable length compensation.

**Syntax: CABLE[$S_P$ LENGTH] $C_R$ [$L_F$]**

**Parts:**

LENGTH (OPTIONAL)

Specifies the total length (in feet) of cable attached between the sensor head and the transmitter box. The valid range for this parameter is 6 to 56. If this parameter is not specified, the length currently set will be transmitted.

**Remarks:**

The default length is 6 Feet. The only way to change the cable length compensation is through the RS232 "CABLE" command. Additional extension cables can be purchased and added to the system, up to a maximum total length of 56 Feet. As total cable length is changed, and error is introduced. This command is used to compensate for that error. When adding extension cable(s), ensure you specify the total length (i.e., 25Ft extension + original 6Ft = 31Ft) with the CABLE command.

**Example 1:**

The following is shown on the PC (terminal) screen after typing "CABLE" and "Enter". The current cable length compensation value is not changed, but it is reported.

**CABLE**
**CABLE LENGTH = 6 FT**
**>**

**Example 2:**

The following is shown on the PC (terminal) screen after typing "CABLE 31" and "Enter". The cable length compensation value is changed to "31" and reported as such.

**CABLE 31**
**CABLE LENGTH = 31 FT**
**>**

**Example 3:**

The following is shown on the PC (terminal) screen after typing "CABLE 200" and "Enter". The cable length compensation value is changed to "56" because the value 200 is above the maximum length of 56.

**CABLE 200**
**CABLE LENGTH = 56 FT**
**>**

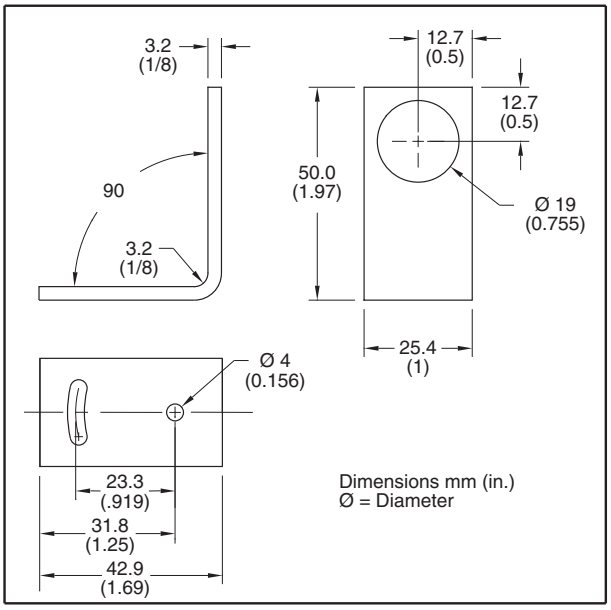



**Figure 3-6. Mounting Bracket OS100-MB**

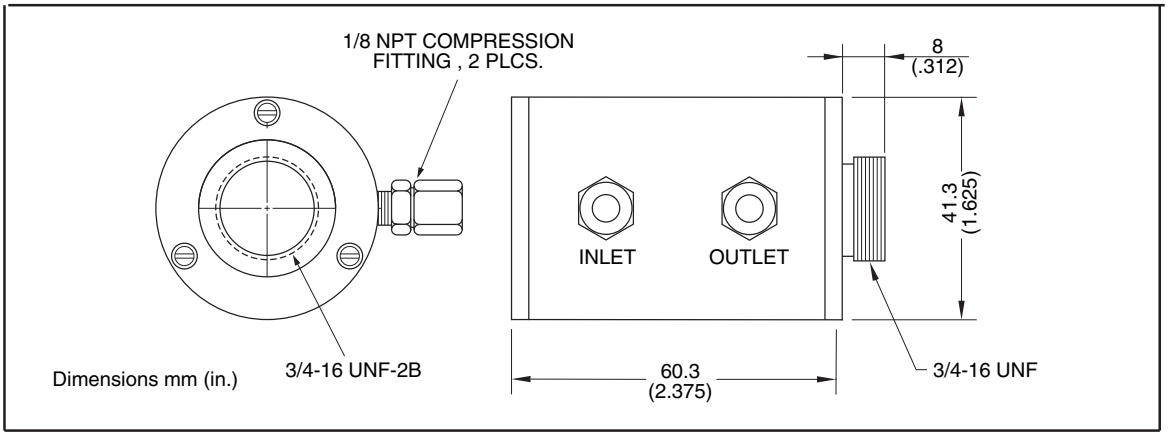



**Figure 3-7. Water Cooling Jacket, OS100-WC**

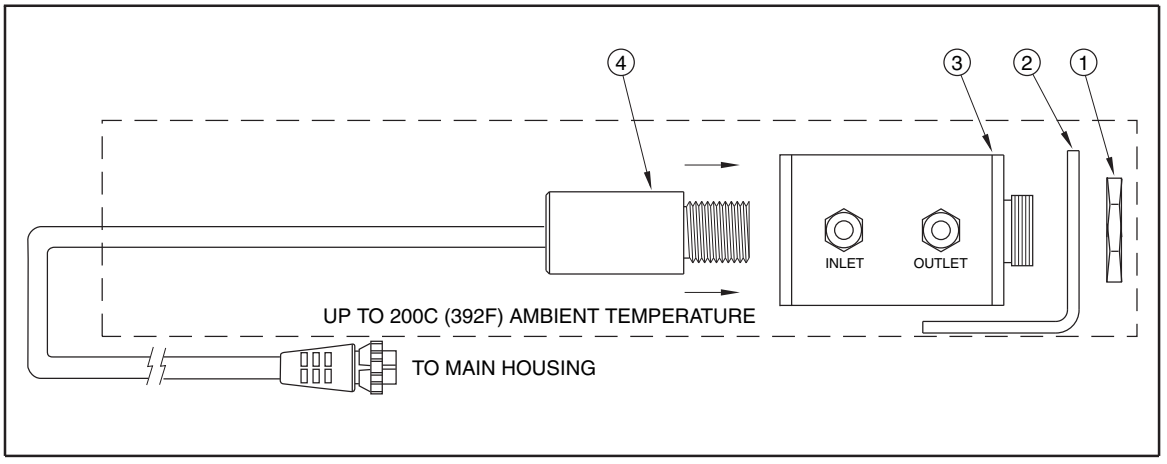



**Figure 3-8. Typical Water Cool Jacket Assembly**

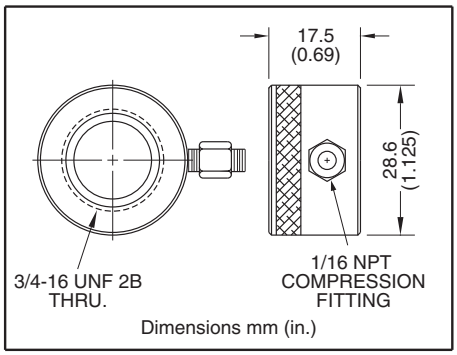



**Figure 3-9. Air Purge Collar, OS100-AP**

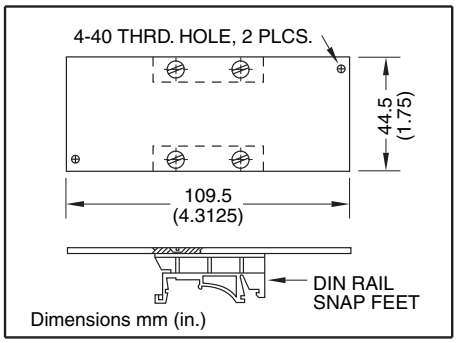



**Figure 3-10. DIN Rail Mounting Adapter, OS-100-DR**

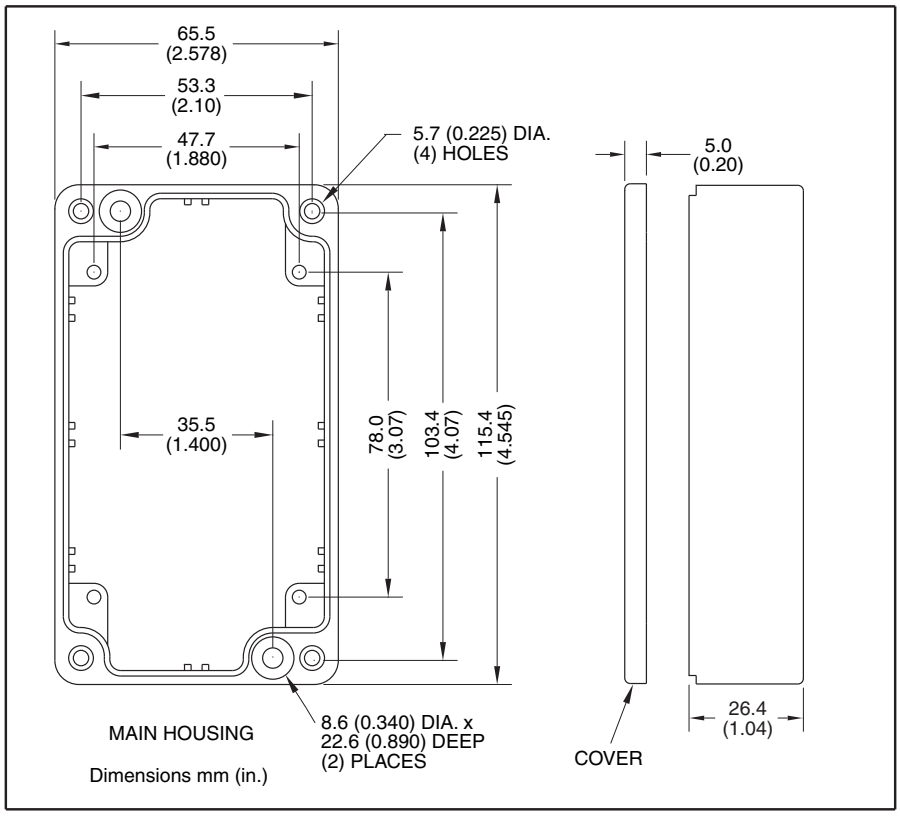



**Figure 3-11. NEMA-4 Aluminum Enclosure**

# NOTES:

# Section 4 – Software

## 4.1 Software Overview

The OS100-Soft application enables you to communicate with your OS100E Series transmitter on a PC using serial communication. The application has the following capabilities:

- Real-time display of temperature reading.
- Data acquisition and plotting of real-time data.
- Saving acquired data in comma separated values (csv) or tab format for easy importation into spreadsheet programs.
- Data analysis function.
- Printing of graph and data.

## 4.2 Hardware Hookup

Wire the OS100E unit to the PC as shown in section 3.7, and table 4-1.

| OS100E, Terminal Block TB1 | | Computer DB-9 Male Connector | |
|---|---|---|---|
| **Pos. No.** | **Description** | **Pos. No.** | **Description** |
| **5** | **Signal GND** | **5** | **Signal GND** |
| **6** | **Rx** | **3** | **Tx** |
| **7** | **Tx** | **2** | **Rx** |

**Table 4-1 OS100E Serial Communications Wiring Table**

## 4.3 Software Installation

### 4.3.1 System Requirements

Minimum System Requirements

The following are the minimum recommended system requirements:

- Windows 98/ME, Windows 2000, Windows XP, Windows Vista, Operating System.
- Available serial port or USB to serial port adapter.
- 26 MB Ram
- 280 MB available hard drive space.

Recommended System Configuration

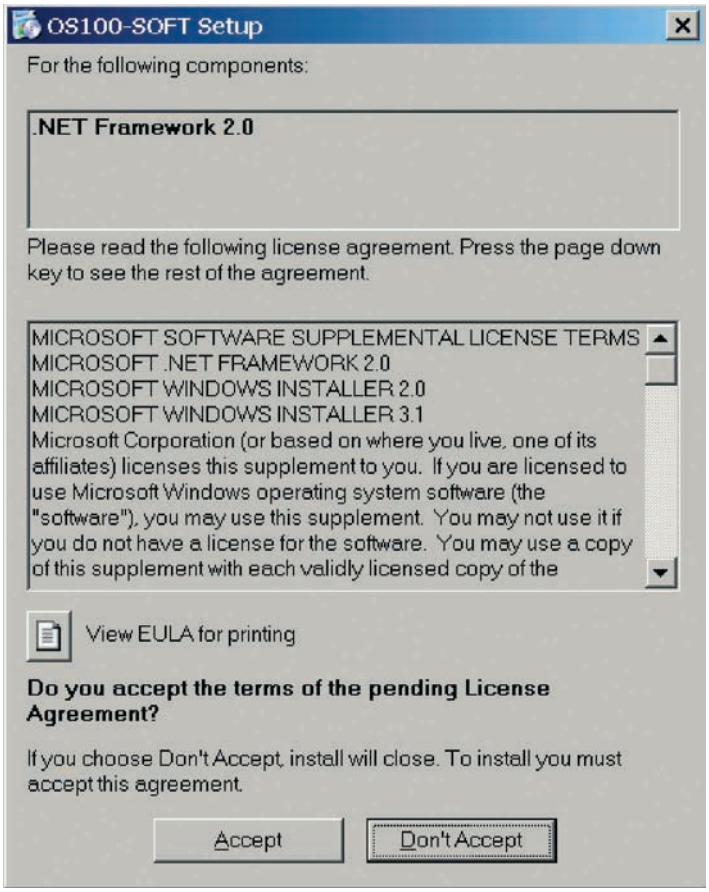
The following system configuration is recommended:

- Windows XP or newer operating system.
- At least 512 MB Ram.
- 280 MB available hard drive space.

### 4.3.2 Software Installation

Insert the OS100-Soft CD into your computer's CD-Rom drive. The installation program should start up automatically. If it does not start automatically locate and run the Setup.exe file on the CD.

Microsoft .NET framework 2.0 is a pre-requisite for this application and will be automatically installed from the CD if missing this will require you to accept the license agreement prior to proceeding.


OS100-SOFT Setup
For the following components:
.NET Framework 2.0
Please read the following license agreement. Press the page down key to see the rest of the agreement.
MICROSOFT SOFTWARE SUPPLEMENTAL LICENSE TERMS
MICROSOFT .NET FRAMEWORK 2.0
MICROSOFT WINDOWS INSTALLER 2.0
MICROSOFT WINDOWS INSTALLER 3.1
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View EULA for printing
Do you accept the terms of the pending License Agreement?
If you choose Don't Accept, install will close. To install you must accept this agreement.
Accept
Don't Accept

**Figure 4-1. NET Framework 2.0 Eula**

Once the .NET framework is installed or if previously installed on your PC the OS100-Soft installation process begins. The first screen displayed is the welcome screen click "Next>" button to continue. This is followed by the Installation Options Screen, check the box if you would like to install a shortcut for the application on your desktop. Click "Next>" button to continue.

The wizard then takes you to the Installation Folder Screen. Accept the default or choose alternate path then click "Next>" button to continue.

This is followed by the Confirm Installation Screen. If satisfied with click “Next>” button to begin installation, otherwise use “<Back” button to navigate to and change settings as needed.

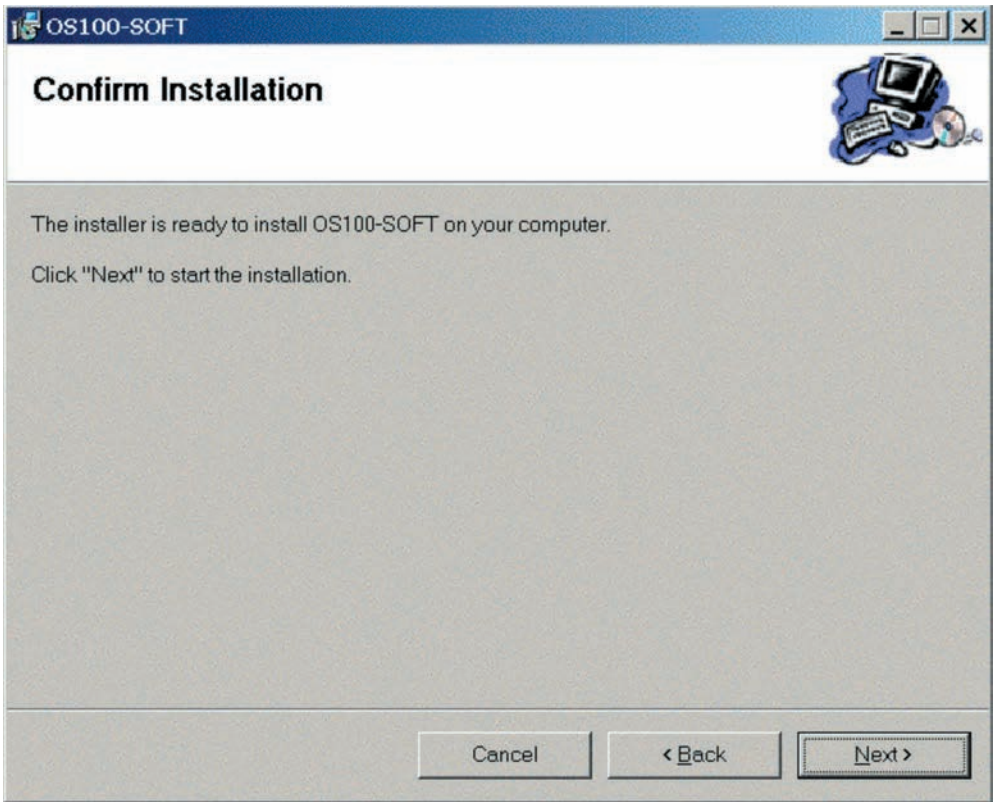
OS100-SOFT
Confirm Installation
The installer is ready to install OS100-SOFT on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >

**Figure 4-2. Confirm Installation Screen**

A license agreement for the OS100-Soft is next displayed, plead read and select “I agree” option to proceed with installation.

OS100-SOFT
License Agreement
Please take a moment to read the license agreement now. If you accept the terms below, click "I Agree", then "Next". Otherwise click "Cancel".
COPYRIGHT NOTICE:
© COPYRIGHT 2007 OMEGA ENGINEERING, INC. ALL RIGHTS RESERVED.
OS100-SOFT Software License Agreement
I Do Not Agree
I Agree
Cancel
< Back
Next >

**Figure 4-3. OS100-Soft License Agreement**

The installation process then begins and the Installation Complete screen is displayed when done. Click “Close” button to finish.

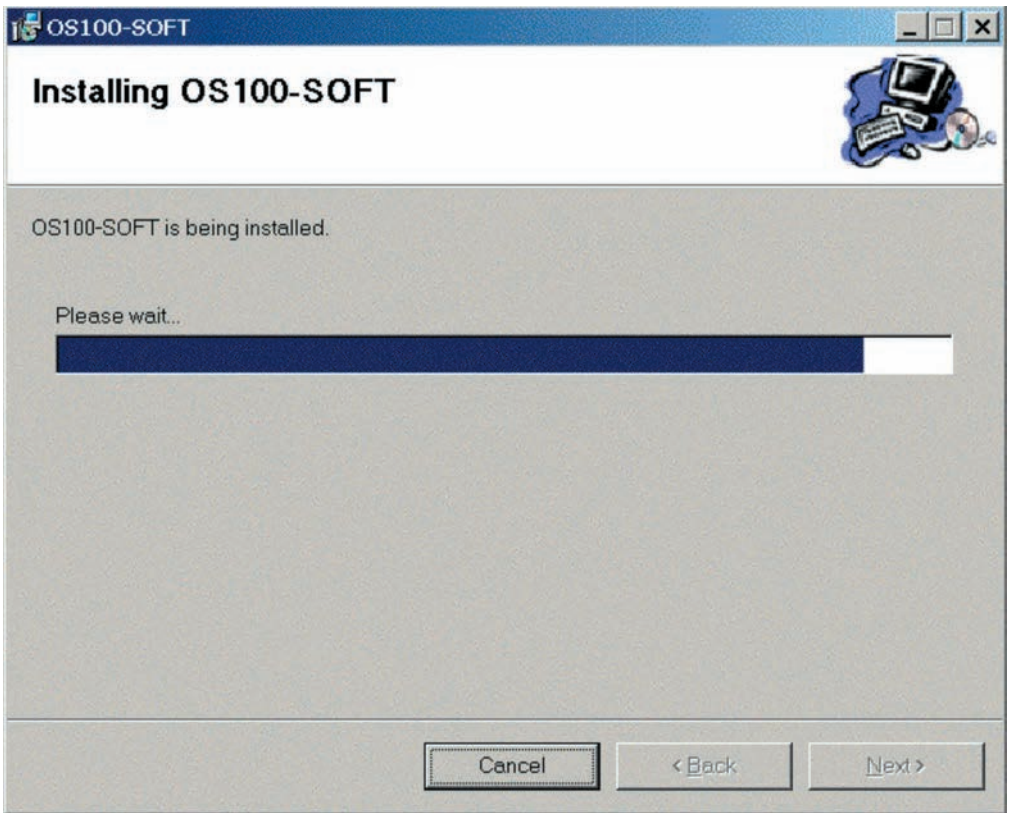


Figure 4-4. Installation in Progress

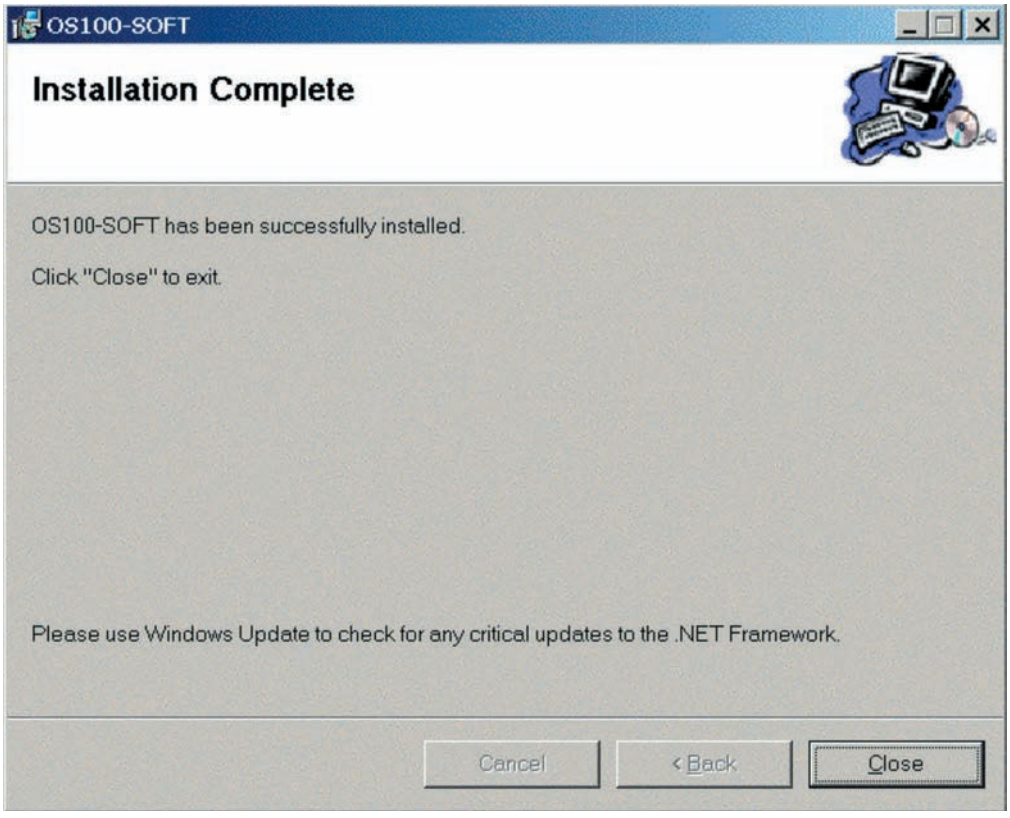


Figure 4-5. Installation Complete

Congratulations! You have successfully installed the OS100-Soft program and you can now use it to communicate with your OS100E series unit(s).

## 4.4 Using Software

To run the application click on the desktop shortcut (if present) or access the program from the Start Menu, Start\Programs\OS100-SOFT\OS100-Soft.exe (or select path installed if different).

The software's online help will guide you through its actual use.

# Section 5 - Laser Sight Accessory

## 5.1 Warning and Cautions

CAUTION:

You may receive harmful laser radiation exposure if you do not adhere to the warnings listed below:

- **Use of controls or adjustments or performance of procedures other than those specified here may result in hazardous radiation exposure.**
- **Do not look at the laser beam coming out of the lens or view directly with optical instruments - eye damage can result.**
- **Use extreme caution when operation the laser sight accessory**
- **Never point the laser accessory at a person**
- **Keep out of the reach of all children**

WARNING:

Do not attempt to open the laser sight accessory. There are no user serviceable parts inside.

## 5.2 Operating the Laser Sight Accessory

The laser sight accessory screws onto the front of the sensor head. This accessory is only used for alignment of the sensor head to the target area. After the alignment process, the accessory has to be removed from the front of the sensor head before temperature measurement.

The laser sight accessory is powered from a small compact battery pack (included with the accessory). Connect the battery pack to the accessory using the cable provided. Aim at the target, and turn on the battery power using the slide switch on the battery pack. Adjust the sensor head position so that the laser beam points to the center of the target area. Turn off the battery pack, and remove the laser sighting accessory from the sensor head. See Fig. 4-1 for reference.

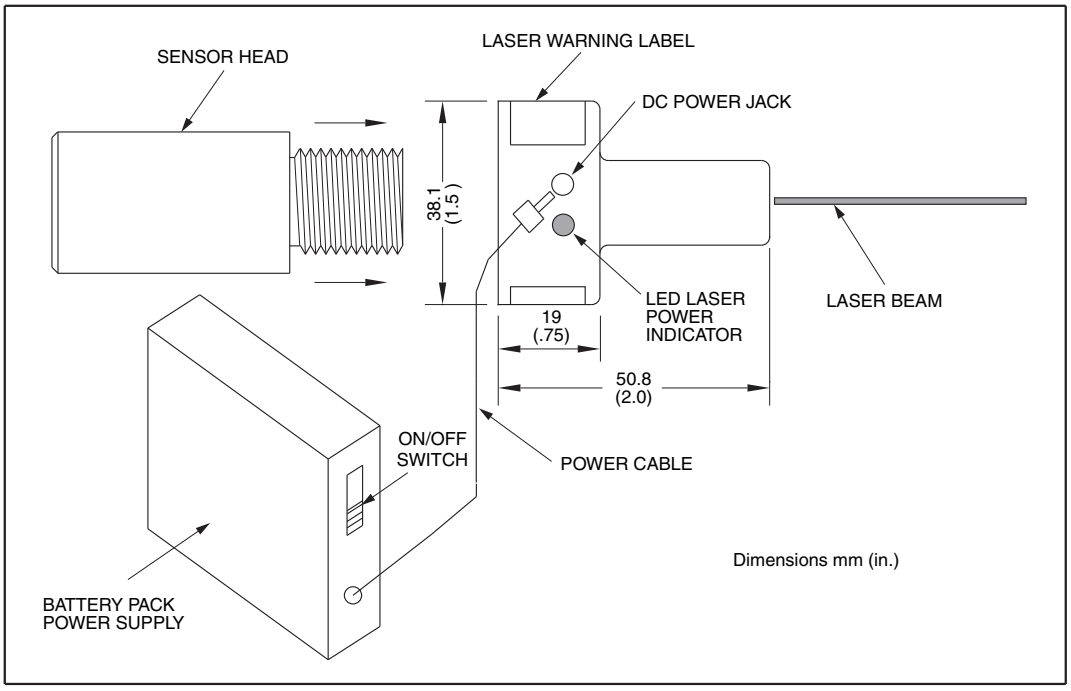


**Figure 5-1. Laser Sighting Accessory, OS100-LS**

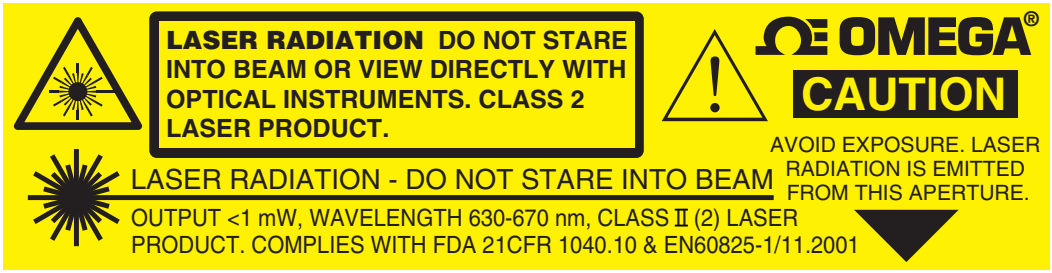
LASER RADIATION DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS. CLASS 2 LASER PRODUCT.
OMEGA®
CAUTION
AVOID EXPOSURE. LASER RADIATION IS EMITTED FROM THIS APERTURE.
LASER RADIATION - DO NOT STARE INTO BEAM
OUTPUT <1 mW, WAVELENGTH 630-670 nm, CLASS II (2) LASER PRODUCT. COMPLIES WITH FDA 21CFR 1040.10 & EN60825-1/11.2001

**Figure 5-2. Laser Warning Label**

# Section 6 - Specifications

## 6.1 General

| | |
|---|---|
| Temperature Range | -18 to 538°C (0 to 1000°F) |
| Accuracy @ 22°C (72°F) ambient temperature & emissivity of 0.95 or greater | ± 2% of Rdg. or 2.2°C (4°F) whichever is greater |
| Optical Field of View | 6:1 (Distance/Spot Size) |
| Repeatability | ± 1% of Rdg. |
| Spectral Response | 5 to 14 microns |
| Response Time | 100 msec (0 to 63% of final value) |
| Emissivity Range | 0.1 to 1.00, adjustable |
| Operating Ambient Temperature | |
| Main Transmitter | 0 to 50°C (32 to 122°F) |
| Sensor Head | 0 to 70°C (32 to 158°F) |
| Sensor Head (-HT Model) | 0 to 85°C (32 to 185°F) |
| Sensor Head with OS100-WC (Water Cooling Jacket) | 0 to 200°C (32 to 392°F) |
| Operating Relative Humidity | Less than 95% RH, non-condensing |
| Water Flow Rate for OS100-WC | 0.25 GPM, room temperature |
| Thermal Shock | About 30 minutes for 25°C abrupt ambient temperature change |
| Warm Up Period | 3 minutes |
| Air Flow Rate for OS100-AP | 1 CFM (0.5 Liters/sec.) |
| Power | 12 to 24 VDC @ 150 m (0-10 Vdc output requires 14 Vdc) |
| Analog Outputs | |
| MV | 1 mV/°F or 1 mV/°C |
| K | K Type TC |
| MA | 4 to 20 mA |
| V1 | 0 to 5 VDC |
| V2 | 0-10 VDC |
| Output Load requirements | |
| Min. Load (0 to 5VDC) | 1 K-Ohms |
| Max. Load (4 to 20 mA) | (Supply Power - 4 )/20 mA |
| Transmitter Housing | NEMA-4 & IP65, Die Cast Aluminum |
| Sensor Head Housing | NEMA-4; Anodized Aluminum |
| Alarm Output | Open Drain, 100 mA |
| Alarm Set Point | 0 to 100% , Adjustable via P3 |
| Alarm Deadband | 12°C (10°F) |
| Alarm Indication | Display Flashing |

## 6.1 General Con't.

| | |
|---|---|
| Dimensions | |
| Sensor Head | 25.4 OD. x 63.5 mm L (1" OD. x 2.5" L) |
| Main Housing | 65.5 W x 30.5 H x 115.3 mm L (2.58" W x 1.2" H x 4.54" L) |
| Weight | 272 g (0.6 lb) |

## 6.2 RS232

| | |
|---|---|
| Baud: | 19200 |
| Data Bits: | 8 |
| Parity: | None |
| Stop Bits: | 1 |
| Handshaking: | None |

## 6.3 Laser Sight Accessory (OS100-LS)

| | |
|---|---|
| Wavelength (Color) | 630 - 670 nm (Red) |
| Operating Distance (Laser Dot) | Up to 9.1 m (30 ft.) |
| Max. Output Optical Power | Less than 1 mW at 22°F ambient temperature. |
| European Classification | Class 2, EN60825-1/11.2001 |
| Maximum Operating current | 45 mA at 3 VDC |
| FDA Classification | Complies with 21 CFR 1040.10, Class II Laser Product |
| Beam Diameter | 5 mm |
| Beam Divergence | < 2 mrad |
| Operating Temperature | 0 to 50°C (32 to 122°F) |
| Operating Relative Humidity | Less than 95% RH, non-condensing |
| Power Switch | ON / OFF , Slide switch on the Battery Pack |
| Power Indicator | Red LED |
| Power | Battery Pack, 3 VDC (Consists of two 1.5 VDC AA size Lithium Batteries) |
| Laser Warning Label | Located on the head sight circumference |
| Identification Label | Located on the head sight circumference |
| Dimensions | 38 DIA x 50.8 mm L (1.5" DIA x 2" L) |

# Section 7 - Emissivity Table

METALS

| Material | Emissivity (ε) |
|---|---|
| Aluminum – pure highly polished plate | 0.04 to 0.06 |
| Aluminum – heavily oxidized | 0.20 to 0.31 |
| Aluminum – commercial sheet | 0.09 |
| Brass – dull plate | 0.22 |
| Brass – highly polished, 73.2% Cu, 26.7% Zn | 0.03 |
| Chromium – polished | 0.08 to 0.36 |
| Copper – polished | 0.05 |
| Copper – heated at 600°C (1112°F) | 0.57 |
| Gold – pure, highly polished or liquid | 0.02 to 0.04 |
| Iron and steel (excluding stainless) – polished iron | 0.14 to 0.38 |
| Iron and steel (excluding stainless) – polished cast iron | 0.21 |
| Iron and steel (excluding stainless) – polished wrought iron | 0.28 |
| Iron and steel (excluding stainless) – oxidized dull wrought iron | 0.94 |
| Iron and steel (excluding stainless) – rusted iron plate | 0.69 |
| Iron and steel (excluding stainless) – polished steel | 0.07 |
| Iron and steel (excluding stainless) – polished steel oxidized at 600°C (1112°F) | 0.79 |
| Iron and steel (excluding stainless) – rolled sheet steel | 0.66 |
| Iron and steel (excluding stainless) – rough steel plate | 0.94 to 0.97 |
| Lead – gray and oxidized | 0.28 |
| Mercury | 0.09 to 0.12 |
| Molybdenum filament | 0.10 to 0.20 |
| Nickel – polished | 0.07 |
| Nickel – oxidized at 649 to 1254°C (1200°F to 2290°F) | 0.59 to 0.86 |
| Platinum – pure polished plate | 0.05 to 0.10 |
| Platinum – wire | 0.07 to 0.18 |
| Silver – pure and polished | 0.02 to 0.03 |
| Stainless steel – polished | 0.07 |
| Stainless steel – Type 301 at 232 to 942°C (450°F to 1725°F) | 0.54 to 0.63 |
| Tin – bright | 0.06 |
| Tungsten – filament | 0.39 |
| Zinc – polished commercial pure | 0.05 |
| Zinc – galvanized sheet | 0.23 |

NONMETALS

| Material | Emissivity (ε) |
|---|---|
| Asbestos Board | 0.96 |
| Asphalt, tar, pitch | 0.95 to 1.00 |
| Brick – red and rough | 0.93 |
| Brick – fireclay | 0.75 |
| Carbon – filament | 0.53 |
| Carbon – lampblack - rough deposit | 0.78 to 0.84 |
| Glass - Pyrex, lead, soda | 0.85 to 0.95 |
| Marble – polished light gray | 0.93 |
| Paints, lacquers, and varnishes – Black matte shellac | 0.91 |
| Paints, lacquers, and varnishes – aluminum paints | 0.27 to 0.67 |
| Paints, lacquers, and varnishes – flat black lacquer | 0.96 to 0.98 |
| Paints, lacquers, and varnishes – white enamel varnish | 0.91 |
| Porcelain – glazed | 0.92 |
| Quartz – opaque | 0.68 to 0.92 |
| Roofing Paper | 0.91 |
| Tape – Masking | 0.95 |
| Water | 0.95 to 0.96 |
| Wood – planed oak | 0.90 |

## NOTES:

## NOTES:

MADE IN USA

# WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **25 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **two (2) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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# RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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